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► To cite this version:

Stefania Marcassa, Grégory Ponthière. Until Death Do Us Part? The economics of short-term marriage contracts. 2010. halshs-00564900

HAL Id: halshs-00564900

<https://shs.hal.science/halshs-00564900>

Preprint submitted on 10 Feb 2011

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PARIS SCHOOL OF ECONOMICS
ÉCOLE D'ÉCONOMIE DE PARIS

WORKING PAPER N° 2010 - 24

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Until Death Do Us Part?

The Economics of Short-Term Marriage Contracts

Stefania Marcassa* and Gregory Ponthiere†

September 13, 2010

Abstract

Common wisdom considers that marriages will last forever, as the default length of a marriage is the total remaining lifespan of the spouses. This paper aims at questioning the prevailing marriage contracts, by exploring the conditions under which short-term contracts would be more desirable. Using a two-period collective household model, we show that, under a large interval of values for household production technology parameters and individual preference parameters, short-term marriage contracts, if available, would dominate long-term contracts. Moreover, the recent equalization of bargaining power within the household is shown to make short-term contracts even more desirable than in the past.

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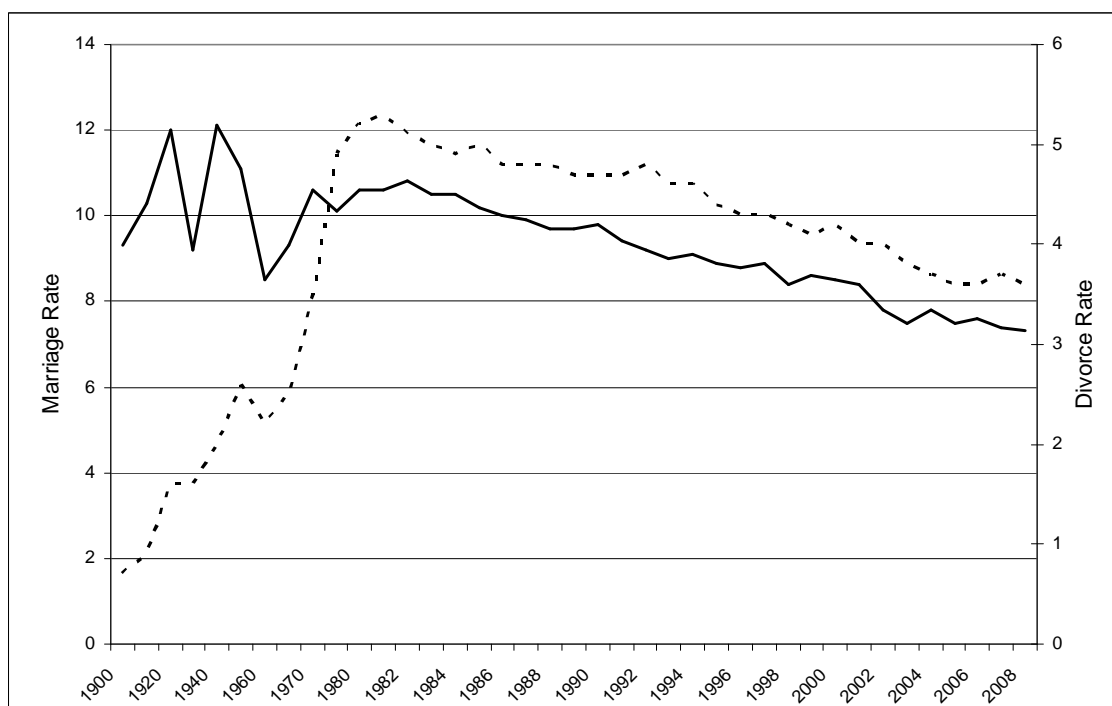
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1 Introduction

“Until Death Do Us Part?” In 2008, about 2,162,000 marriages were celebrated in the U.S. At the same time, the number of divorces amounts to about 1,099,080.¹ Moreover, as we can see from Figure 1, while the marriage rate remained relatively constant during the twentieth century, the divorce rate was multiplied by a factor of 5 from 1900 to 1980.

Figure 1: U.S. Marriage and Divorce Rate per 1,000 Population



Sources: National Center for Health Statistics, U.S.

When looking at those figures, we may wonder whether the traditional marriage contract is still appropriate. The existing marriage contract takes, as the default length, the total remaining lifespan of the spouses. In the light of the high divorce rate observed, and of the non-negligible costs of divorce, it may make sense to propose

¹Sources: National Center for Health Statistics, U.S., data available at <http://www.cdc.gov/nchs/fastats/divorce.htm>.

marriage contracts with a shorter default length, that is, a short-term marriage contract. Actually, short-term marriage contracts would allow spouses to exit the marriage “naturally”, i.e. without costs.

The goal of this paper is precisely to study the desirability of short-term marriage contracts. We propose to explore the conditions under which short-term contracts, if available, would be more desirable from the point of view of a couple. Quite surprisingly, short-term marriage contracts have received little interest so far.

Actually, it is outside academic economics that short-term marriage contracts are discussed. In 2009, the Australian Bureau of Statistics floated the idea of marriage licenses that expire after 5 or 10 years, unless couples renew it.² But the idea of short-term marriages is actually quite old, since one can find traces of such practices in the Muslim culture (the Nikah Mut’ah in the Shi’a Islam) and also in the Pre-Islamic Arab culture (the Nika’e’Misyar in Sunni Islam)³.

Within economics, a pioneer discussion on the introduction of short-term marriage contracts was provided by Jeremy Bentham. As emphasized by Sokol (2009), Bentham had, in various (so far unpublished) writings between 1773 and 1797, discussed the opportunity to introduce short-term marriage contracts. His motivations were various, but always based on the Principle of Utility. Among other things, Bentham regarded these short contracts as appealing alternatives to long contracts at a time when divorce was not easily available in England. Moreover, Bentham supported short-term contracts for the young, who would otherwise not be able to enter lifelong relationships. Bentham acknowledged that standard long-term contracts are compatible with the Principle of Utility for *some* couples, but wanted to add short-term contracts as these would better fit some *others*. Finally, the short-term contract was also regarded by Bentham as a way to give respectability, legal rights and financial support to prostitutes.

More recently, the marriage contract has attracted a large attention on both theoretical and empirical grounds, but, as far as we know, little was said on the contract duration, despite Bentham’s revolutionary proposal. Some issues have been addressed, such as the role of informational constraints on outside opportunities (Peters (1986)), prenuptial contracting behavior (Hamilton (1999)), the actual duration of marriages (Matouschek and Rasul (2008)) and the length of the interval between relationships (Ermisch (2002)).⁴ However, the issue of the optimal duration of the marriage contract has not been studied.

²See Goltz (2009).

³For completeness, it should be added that the Celtic practice of handfasting (trial marriage) is often associated with fixed-term marriage.

⁴Various aspects of marriage are also discussed in Dnes and Rowthorn (2002).

Note that the optimal contract duration has been studied in other economic fields. In a seminal paper, Harris and Holmstrom (1987) used a two-agents setting (lender and borrower) with infinite horizon to show that the optimal contract duration increases with the recontracting costs, which coincide here with the cost of information extraction. Crawford (1988) examined the impact of contract duration on the incentive to invest in a relationship when parties are rational and have perfect information, under complete contract. Cantor (1988) explored, under asymmetric information, the effect of the employment contract duration on the efforts of workers. He showed that a worker can be induced to put forth unobservable effort if he knows that his wages in future contracts will be related to his past overall productivity. More recently, the macroeconomic and welfare effects of short-term employment contracts were studied by Blanchard and Landier (2002).

Despite the considerable attention paid to the duration of agreements and contracts, the existing literature has not so far applied optimal duration contract analysis to the marriage contract. This paper aims at making a first step in that direction. More precisely, the goal of this paper is twofold. First, it provides formal conditions under which a short-term marriage contract is preferred, by an *individual*, to the traditional long-term contract. Second, it derives formal conditions under which the short-term marriage contract, if available, would be chosen by the *couple*.

For that purpose, we consider a simple two-period collective household model where agents differ in gender (male and female) and in marital status (single, married, divorced). In this model, there is perfect information and no risk. Agents produce and consume a single good, and make decisions on marital status at the beginning of every period. Within that framework, the decision on marital status depends on the costs of divorce and marriage, on the productivity gains induced by marriage, and on the bargaining power of each agent within the couple.

In the first part of the paper, we show, under a constant household productivity, that the long-term contract dominates, in general, the short-term contract, except when agents were married by mistake. Then, in the second part of the paper, we consider a more general household technology which allows productivity to depend on the duration of the marriage. In this more general framework, the short-term contract dominates the long-term contract for a wide interval of parameters values, in particular when the household's productivity is decreasing with marriage duration.

Finally, it should be stressed that the simplicity of the present model allows for a large set of interpretations, depending on what the unique good consists of. One can think of it as a standard consumption good (consumed individually but produced either individually or in couples), or as a leisure activity. It may also be thought of as a child produced and enjoyed by parents. Those different interpretations are not

benign for the values to be assigned to the parameters of the model, and they may also influence our conclusions regarding the desirability of short-term contracts.

The rest of the paper is organized as follows. Section 2 presents the basic framework. A more general production technology is then introduced in Section 3. Section 4 concludes.

2 The basic model

2.1 Environment

Let us consider a two-period model, where the population of agents is composed of two types designed by the superscripts m and f , for men and women respectively. For simplicity, we assume that the cardinality of the sets of men and women are equal, and we also assume that one can only get married or divorced with someone from the other group.

Agents can be, during each period of life, in three different states, depending on the marital status: one can be either single (S), divorced (D) or married (M)⁵. When singles, agents receive a random marriage offer from an agent of different gender. The marriage offer only includes the consumptions in the two periods.⁶

For analytical convenience, agents have a period utility function that is logarithmic in consumption. Lifetime welfare takes a standard time-additive form, with a pure discount factor denoted by β . The household values the weighted sum of spouses utilities, with weights representing the bargaining power of each spouse, respectively μ_m for men and μ^f for women. We assume as usual $\mu^j \geq 0$ and $\mu^m + \mu^f = 1$.⁷

On the production side, all agents inelastically work for the entire period of time, and have an individual productivity parameter denoted by I . There is no differences in individual productivity of agents, and they all produce the same good.

Married agents combine individual productivities in a cooperative household production unit producing a total amount of good equal to $\eta 2I$, where $\eta > 0$ represents the efficiency gain (if $\eta > 1$) or loss (if $\eta < 1$) from the marriage.

On the consumption side, unmarried agents entirely consume the product of their labor. When married, it follows from the shape of the household value function and from the logarithmic temporal utility that the husband consumes a fraction μ_m of the household production $2\eta I$, and the wife consumes a fraction μ^f .

⁵In the first two states, the household size is 1, whereas it equals 2 in the third state.

⁶Note that the present model is extremely simplified regarding the matching process. As such, this eliminates a potential determinant of the desirability of short-term contracts.

⁷See the Appendix for a detailed presentation of the problem.

At $t = 0$, the economy is populated by married, single and divorced agents.⁸ At the beginning of periods 0 and 1, agents make decisions on marital status, which determine the marital status of the next period. That is, single agents can decide to get married or remain single; divorced agents can remain divorced or get married again; married couples may either remain married, divorced or become single (depending on the length of the marriage contract).

We consider two kinds of marriage contracts which differ in their duration. On the one hand, agents may choose a long contract, which is supposed to last for the rest of the life of the spouses (i.e. the two life-periods), except if there is a divorce. On the other hand, agents may choose a short marriage contract, which is supposed to last only one period, after which agents become “naturally” singles again, at no cost. Hence the main difference between the two contracts concerns the exit cost, or, alternatively, the continuation cost.

When deciding to get married or divorced, each agent compares her welfare in the two states. Then, the choice of the marriage contract (i.e. short or long) is driven by the preferences of the couple-member with the *lowest* bargaining power, i.e. by the $\min \mu^j$. In other words, the weakest agent in the couple has a veto right regarding both the marriage decision and the contract decision.⁹ The decision of getting divorced depends on the legal regime of divorce. If consensual, the willing of the agent with the $\max\{\mu^m, \mu^f\}$ will drive the decision. If unilateral, the willing of the agent with the $\min\{\mu^m, \mu^f\}$ will drive the decision.

The cost of getting married is a fraction λ of the household’s income, with $\lambda \in (0, 1)$. The cost of getting divorced (e.g. legal fees, alimony transfers etc.) is a fraction γ , with $\gamma \in [0, 1)$, of the household’s income.

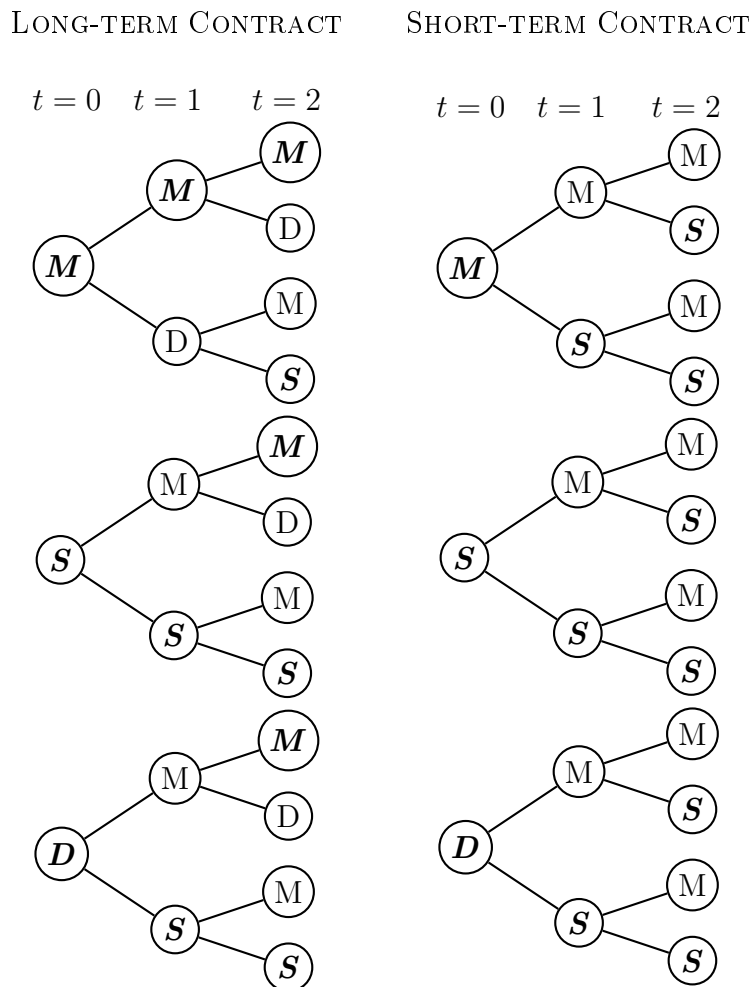
The model is solved by backward induction, starting from decisions made at the terminal node, which is the beginning of period 2.¹⁰ Here is a graphical representation of all possible decision nodes under the two types of marriage contract (long-term contract on the left column and short-term contract on the right column), where M stands for married, D for divorced, and S for single. The nodes in bold are the costless options (or “natural” paths). The key difference between the two columns lays on the location of the “natural” paths. In the long-term contract the “natural” path is to remain married (as divorce is costly). In the short-term contract, the

⁸The initial marital status is taken as given by the agents.

⁹Note that we assume, following the literature, that agents know their bargaining power within the couple *before* being married, as this is logically anterior to the decision to get married. One can justify this by considering that the bargaining power depends on various observable variables (e.g. the wage, legal aspects).

¹⁰See the Appendix for the detailed computation.

“natural” path is to become single whenever married in the previous period. This difference affects the gains and losses associated to each option over the life-cycle: by changing the entry and exit costs, the duration of the marriage contract is far from neutral.



In the rest of the paper, we will study the choices between the different marital status under both marriage contracts *simultaneously*. We will also compare those choices with what would have prevailed in the absence of short-term marriage contracts. The following proposition summarizes the optimal choices of agent $j = f, m$ for different values of the parameters.

Proposition 1. (a) For agent j , if $2\mu^j(1-\lambda)\eta > 1$ or $2\mu^j(1-\lambda)\eta \leq 1$ and $2\eta\mu^j > 1$, the long-term contract is better than the short-term contract regardless of the initial marital status.

(b) For agent j , if $2\eta\mu^j \leq 1$, then the short-term contract is better if agents are initially married; and there is indifference between the two contracts if agents are initially singles or divorced.

Proof. See the Appendix. □

Proposition 1 tells us that the long-term marriage contract dominates the short-term contract in the present framework. Indeed, if the individual gains from marriage are sufficiently large (η sufficiently large), then agents prefer the long-term contract (to avoid the cost of remarriage). On the contrary, if the individual gains from marriage are low, then agents prefer being single, and so they are indifferent between the two marriage contracts. Hence the only case where the short-term contract is better is the one where agents are initially married and want to become single. In that particular case, due to an initial mistake (or lack of rationality), the short contract is better, as this is the cheapest way to become single.

How does Proposition 1 translate into actual agreements? In particular, can this rationalize the history of actual marriage contracts? Proposition 2 provides an answer to those questions under the cases of consensual and unilateral divorces. The difference between those two cases is that, in the former case, the divorce decisions are driven by agents with the maximum bargaining power $\mu^j = \max\{\mu^m, \mu^f\}$, whereas in the latter case, the divorce decisions are driven by agents with the minimum bargaining power $\mu^j = \min\{\mu^m, \mu^f\}$.¹¹

Proposition 2. (a) Suppose the divorce is consensual. Long-term marriage will prevail in all cases, except when $2\eta \min\{\mu^m, \mu^f\} \leq 1$, in which case we have either a short-term contract (if agents are initially married by mistake), or singleness (in other cases). Note that, in the absence of short-term contracts, long-term marriage would have prevailed in these cases, except when we also have $2\eta \max\{\mu^m, \mu^f\} \leq 1$, in which case the divorce would have prevailed.

(b) Suppose the divorce is unilateral. Long-term marriage will prevail in all cases, except when $2\eta \min\{\mu^m, \mu^f\} \leq 1$, in which case we have either a short-term

¹¹Note that, if the division of bargaining power is fair, i.e. $\mu^j = 1/2$ for all j , then $\min\{\mu^m, \mu^f\} = \mu^j = \max\{\mu^m, \mu^f\}$, so that the decision of each individual coincides with each other, and, hence, with the decision of the couple.

contract (if agents are initially married by mistake), or singleness (in other cases). Note that in the absence of short-term contracts, divorce would have prevailed in these cases.

Proof. See the Appendix. □

Note that the prevalence of one marriage contract or another is independent from agents' time preferences. The reason why this is so is merely that the productivity gains from marriage are constant over time, so that if one agent wants to be married in period 1, she wants also to be married in period 2. Hence the prevailing marriage regime depends only on the distribution of bargaining power and on the productivity gains resulting from marriage.

The household sharing rule μ^j plays a particular important role. The value added of the short-term contract depends on the bargaining power of the weakest agent, i.e. the one with the lowest μ^j . If μ^j is sufficiently lower than $1/2$ for agent j , then the short-term contract is preferred by agent j , even for a large η . Hence the long-term contract is dominant only for sufficiently fair divisions of power within the household.

What does Proposition 2 tell us about history? At first sight, Proposition 2 seems to rationalize the existing long-term contracts. Indeed, provided the efficiency gains within the household are sufficiently large, and provided the division of power in the household is sufficiently fair, existing long-term contracts are optimal. History is rational.

Note that the way in which we interpret history in the light of Proposition 2 depends also on what the consumption/production good consists of. If, for instance, that good is a child, then this has the following consequences for the parameterization of the model: individual productivities for single agents I are close to zero, while the household productivity gain η is high (as only a couple can produce that good). As a consequence, in such a framework where individual welfare is derived exclusively from children's enjoyment, it is not surprising that the long-term marriage contract dominates other alternatives. This constitutes another rationalization of history.

These two ways of interpreting history as rational may be questioned on several grounds. The division of power within the household may have not been fair across centuries (at least until the second half of the twentieth century). Of course, it is difficult to estimate the bargaining power within the household, but if that assumption is correct, the long-term contract might have been optimal for men only, and not for women (preferring singleness). If the marriage is consensual, such an unbalanced distribution of power would have led to no marriage (neither short nor long). Thus the observed marriage rates would reflect either the non-consensual nature of

marriage at that time, or some mistakes in calculations (e.g. wrong expectations on bargaining power once married). But in any case, within the present framework, the short-term contract would never have been chosen, because if a woman prefers singleness to a long-term contract, she must also prefer singleness to a short contract. In sum, according to that alternative interpretation of history, it is only quite recently that the long-term marriage contract would have become optimal for *both* agents. Before that, the long-term contract would have been imposed by institutions (e.g. the Church) defending the interests of the dominating subgroup.

All in all, it is only in the special case where agents are initially married that the short-term contract can be optimal, as a way to repair a mistake made by Nature. Thus Proposition 2 can hardly justify the introduction of a short marriage contract. Note, however, that the model we considered so far suffered from a sizeable simplification: the gains from being married are constant over time, and perfectly anticipated by agents.¹² In the next section, we consider a more general framework where the household production function depends on the length of the marriage contract.

3 Household technology

Now, we assume that household productivity in the second period of marriage differs from the productivity in the first period of marriage by a factor δ . If $\delta < 1$, the household becomes less productive as the length of the marriage increases. If $\delta > 1$, the length of the marriage makes agents even more productive. Finally, under $\delta = 1$, household productivity is constant with the length of the marriage, and we are back to the previous model. The following propositions summarize the optimal choices of agent $j = f, m$ for different values of the parameters.

Proposition 3. *Suppose agents are initially single (or divorced).*

- (a) *If $(1 - \lambda)2\eta\mu^j > 1$ and $2\eta\delta\mu^j > 1$ and $\delta \geq 1 - \lambda$, then the long-term contract is better than the short-term.*
- (b) *If $(1 - \lambda)2\eta\mu^j > 1$ and $2\eta\delta\mu^j > 1$ and $\delta < 1 - \lambda$, then the short-term contract is better than the long-term contract.*

¹²This simplification explains why the extra-flexibility allowed by the short-term contract is scarcely valued by agents. Under our assumptions on household technology, if they preferred to be married in period 1, they also wanted to be married in period 2. Alternatively, if they preferred to be single in period 1, the same was also true in period 2. As a consequence, allowing agents to become single for free was hardly valuable, which explains why the long-term contract was almost completely dominant.

- (c) If $(1 - \lambda)2\eta\mu^j > 1$ and $2\eta\delta\mu^j < 1$, then the short-term contract is better than the long-term contract.
- (d) If $(1 - \lambda)2\eta\mu^j < 1$ and $2\eta\delta\mu^j > 1$, then the long-term contract is better than the short-term contract.
- (e) If $(1 - \lambda)2\eta\mu^j < 1$ and $2\eta\delta\mu^j < 1$, then there is indifference between the short-term contract and the long-term contract, in the sense that these are both dominated by singleness.
- (f) If $(1 - \lambda)2\eta\mu^j = 1$ then if $2\eta\delta\mu^j > 1$, the long-term contract is preferred. However, if $2\eta\delta\mu^j < 1$, then there is indifference between the two contracts, in the sense that these are both dominated by singleness.

Proof. See the Appendix. □

Proposition 4. *Suppose agents are initially married.*

- (a) If $(1 - \lambda)2\eta\mu^j > 1$ and $2\eta\delta\mu^j > 1$ and $\delta \geq 1 - \lambda$, then the long-term contract is better than the short-term contract.
- (b) If $(1 - \lambda)2\eta\mu^j > 1$ and $2\eta\delta\mu^j > 1$ and $\delta < 1 - \lambda$, then the short-term contract is better than the long-term contract provided $(1 - \lambda)^{(1+\beta)} > \delta^\beta$.
- (c) If $(1 - \lambda)2\eta\mu^j > 1$ and $2\eta\delta\mu^j < 1$, then the short-term contract is better than the long-term contract.
- (d) If $(1 - \lambda)2\eta\mu^j < 1$ and $2\eta\delta\mu^j > 1$, then the long-term contract is better than the short-term contract.
- (e) If $(1 - \lambda)2\eta\mu^j < 1$ and $2\eta\delta\mu^j < 1$, then the short-term contract is better than the long-term contract.
- (f) If $(1 - \lambda)2\eta\mu^j = 1$ then if $2\eta\delta\mu^j > 1$, the long-term contract is preferred. However, if $2\eta\delta\mu^j < 1$, then the short-term contract is better than the long-term contract.

Proof. See the Appendix. □

In the light of Propositions 3 and 4, it appears that there exist new cases that are favorable to the short-term contract, which did not exist under constant household productivity.¹³

To see this, let us focus first on the case where agents are initially single (or divorced). If household productivity is very large and if the cost of marriage is not too large, the long-term contract is still superior. However, if the cost of remarriage is sufficiently low with respect to the productivity loss due to marriage duration (i.e. $\delta < 1 - \lambda$), then agents will prefer two short marriage contracts instead of a long one (i.e. case (b)). In that case, agents want to be married, and the productivity loss induced by duration makes the short-term contract better. The same is true if there is a bigger household productivity drop due to marriage duration (i.e. case (c) if $2\eta\delta\mu^j < 1$). In sum, when agents are initially singles (or divorced), the new case supporting short-term contracts is the one where remarriage costs are dominated by the productivity gains from a new marriage, as this makes agents prefer two short-term contracts rather than one long-term contract.

Turning now to Proposition 4, we can still observe the same new case for short-term contracts (i.e. cases (b) and (c)). Here again, if there is a big household productivity drop (i.e. case (c)), there is a support for short contracts. However, in case (b), note now that the condition for preferring short-term contracts is here stronger than with single individuals (Proposition 3). The reason why this condition is stronger comes from the fact that, if agents are initially married, they do not need to repay any marriage cost under a long contract - unlike what was the case if they were initially single - and this brings some extra support for the long-term contract in comparison with case (b) within Proposition 3. Those gains in the first period of a long-term marriage contract have to be weighted against the second-period losses due to the household productivity drop under a long contract, and this explains why the time preference parameter β plays some role here. Indeed, the first-period consumption in case of initially married agents varies according to the marriage contract (for the reason mentioned above), unlike what prevails in case of initially single agents (where the marriage cost has to be paid *whatever* the contract is). This explains why the comparison of marriage contracts now involves the time preference parameter, as how gains and losses across periods are weighted affects the desirability of short or long marriage contracts.¹⁴

¹³It is also straightforward to check that Propositions 3 and 4 vanish to Proposition 1 in the special case of a constant household productivity (i.e. $\delta = 1$).

¹⁴Note that, if agents are strongly impatient, i.e. β close to 0, the extra condition in Proposition 4 case (b) is never satisfied. Hence, in that case, whereas there is an argument for short-term contract when agents are initially singles, this argument vanishes when agents are initially married.

In short, when agents are initially married, short-term contracts may be better than long-term contracts when agents are sufficiently patient, provided the cost of remarriage is not too high, or the future household productivity induced by duration is low, i.e. $\delta < 1 - \lambda$. However, a short contract is a way to benefit from the revival of the household due to “having a break”. In that case, the best option is to choose a short-term contract, to avoid a big productivity drop, and, then, to get married again under another short contract. This solution dominates the long-term contract plus divorce option, as the short-term contract is a cheaper way to make a break, by becoming single “naturally”.

Finally, note that the time preference parameter β affects the desirability of short-term contracts at the individual level *only* in case (b) of Proposition 4, but in no other case. One would expect *a priori* that time preferences play a much bigger role in the individual decision. Patience plays a role only in case of small household productivity drops due to marriage duration. Indeed, if there is a large productivity drop, the short-term contract is necessarily better, and impatience cannot change that. In the other cases, the long-term contract dominates the short-term contract.

All in all, the possibility of non constant household technology introduces several distinct cases where the short-term marriage contract dominates the long-term one. As a consequence, if one wants to rationalize the existing long-term contracts, this can only be done for all cases by assuming a non-decreasing household productivity. Otherwise, and despite the absence of any risk or unanticipated event, the short-term contract may be superior, thanks to the possibilities either to become single for free, or to marry again and benefit then from the “revival” of the new marriage.

Let us now consider the prevailing marriage contracts in this environment. Propositions 5 and 6 show which situation prevails in the case where agents are initially single¹⁵. In both Propositions 5 and 6, the cases (a)-(f) refer to the conditions on parameters stated in Proposition 3. Moreover, LT stands for long-term marriage contract, ST stands for short-term marriage contract, and S stands for single. The cell is empty when the case cannot occur.

¹⁵Note that, to avoid redundancy, we do not consider here the cases where agents are initially married or divorced.

Proposition 5.

Table 1: Divorce **with** short-term contracts

$\bar{\mu} \mid \underline{\mu}$	(a)	(b)	(c)	(d)	(e)	(f)
(a)	LT		ST	LT (ST) if β high (low)	S	S
(b)		ST	ST		S	S
(c)			ST		S	S
(d)				LT (ST) if β high (low)	S	S
(e)					S	
(f)				LT (ST) if β high (low)	S	

Proof. See the Appendix. □

Proposition 6.

Table 2: Divorce **without** short-term contracts

$\bar{\mu} \mid \underline{\mu}$	(a)	(b)	(c)	(d)	(e)	(f)
(a)	LT		LT (S) if β low (high)	LT (S) if β high (low)	S	S
(b)		LT	LT (S) if β low (high)		S	S
(c)			LT (S) if β low (high)		S	S
(d)				LT (S) if β high (low)	S	S
(e)					S	
(f)				LT (S) if β high (low)	S	

Proof. See the Appendix. □

In the light of Proposition 5, it appears that short-term contracts, when available, prevail in various cases as an alternative dominating singleness and long-term contracts. There remain only three cases where the long-term contract dominates. First, the obvious case where the productivity gains induced by marriage are large and persistent (i.e. case (a)-(a)). Second, the case where the distribution of power in the household is such that the man would like to have a long contract, while the woman is only interested in marriage for the second period (thanks to the sufficiently

good returns from marriage in period 2), but is sufficiently patient (i.e. a high β) (i.e. case (a)-(d)). Third, the case where both the man and the woman only appreciate marriage in the second period, and are sufficiently patient (i.e. cases (d)-(d) and (f)-(d)). In all other cases, what prevails is either short-term marriage contracts (if sufficiently high returns from marriage in both periods or in the first period when agents are impatient) or singleness (if low returns from marriage in all periods). It should be stressed that those results are invariant to the existing divorce regime (i.e. consensual or unilateral).

Proposition 6 states that, in the absence of short-term marriage contract, all the intermediate cases where short-term contracts prevail would now involve either long-term marriage contracts or singleness, depending on the household production technology and the agents' preferences.

What do Propositions 5 and 6 tell us about history? To interpret the large prevalence of long-term marriage contracts, it is crucial to have a closer look at the *motivations* behind the emerging long-term contracts in the absence of short-term contracts. In the absence of short-term contracts, agents can be married under a long-term contract regime because of different motives: some agents are married by *impatience* in the sense that they are currently enjoying large household productivity gains and forget the future costs of marriage, whereas other agents are married by *patience*, in the sense that they are currently suffering from low returns, but hope to get more from marriage in the future. These distinct motivations have tremendous effects on what would have prevailed in the presence of short-term contracts. Actually, if agents are married by impatience in the absence of short-term contracts, those agents would have opted for a short-term contract if this was available. On the contrary, if agents are married by patience, the introduction of short-term contracts would not necessarily affect the emerging marriage regime, as long-term contracts remain the unique way to benefit from large household returns growth over time.

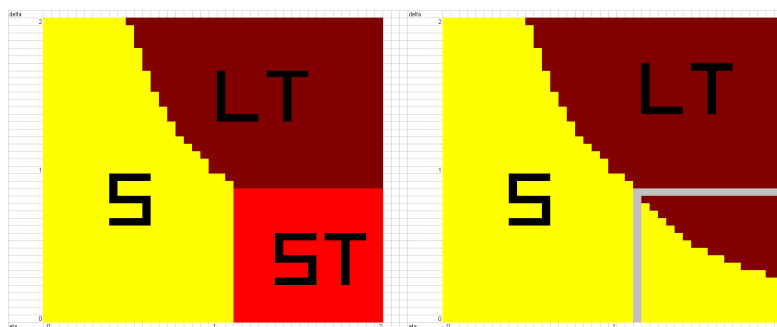
Regarding the role of the distribution of bargaining power within the household, it should be noticed that a movement towards an equality of bargaining power coincides, in Proposition 5, with a convergence towards the diagonal of the table, where both agents face the same conditions. What are the consequences of such a shift on the desirability of short-term contracts? Without additional information on preference parameters and production parameters, it is hard to say whether short-term contracts would have prevailed in the past provided these were available, and also whether these would be prevailing today under a more equal intra-household distribution of bargaining power. To have a more precise idea, let us follow Bernoulli's Principle of Insufficient Reason, and consider all subcases as equally likely (and assign a probability of 1/2 when there is indeterminacy within a particular subcase).

We get that the short-term contract, if available, would have prevailed with a probability of 55/180. On the contrary, if we focus on the diagonal of the table only, we see that short-term contracts would have prevailed today with a much larger probability, equal to 1/2. Therefore, the historical evolution of intra-household bargaining power does affect the above conclusions. If $\mu_m = \mu_f$, the prevalence of short-term contracts is more likely. Hence, the recent redistribution of bargaining power does make short-term marriage contracts more desirable than ever before.

As in the previous section, the extended framework can also be interpreted in various ways, depending on what the single good consists of. In particular, if the good consists of a leisure activity consumed individually or within a couple, a major determinant of the optimal marriage contract consists of the parameter δ . If the activity involves increasing returns from intra-couple interactions (e.g. chess playing), δ is large, which supports long-term contracts. On the contrary, if the leisure activity involves decreasing intra-couple returns over time, then this supports short-term contracts. One can also turn back to the interpretation of the good as a child. In that context, a low η and a high δ lead to interpret the first period of marriage as a kind of trial or probation period, which supports a long-term marriage. On the contrary, a high η and a low δ support a short-term contract, as the old couple can no longer bear the idea of having new children, unlike new couples.

Finally, let us conclude this section by some numerical illustrations aimed at showing how the prevalence of various marriage contracts depends on the various parameters of the model. For this purpose, we assume an equal division of bargaining power, i.e. $\mu_m = \mu_f = 1/2$, a time preference factor $\beta = 0.96$, as well as a marriage cost $\lambda = 0.10$. The figures below show the prevailing situations when the household production parameters η and δ lie in the $[0,1]$ interval. In the left figure, the short-term contract is available, unlike in the right figure.

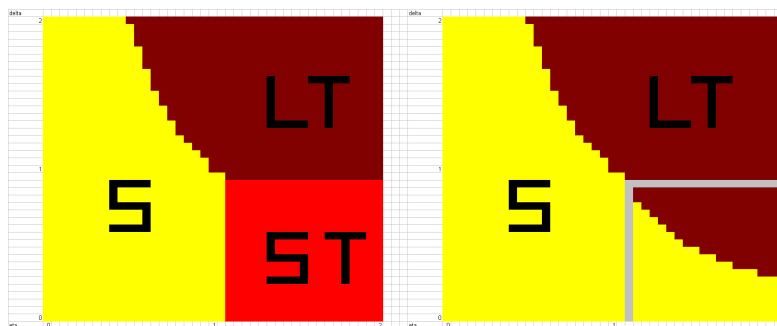
Figure 2: Numerical Exercise (1): $\lambda = 0.10$



Unsurprisingly, the short-term marriage contract prevails when the gains of marriage are large but temporary, that is, when the economy lies in the bottom-right corner (i.e. η is large and δ is low). The long-term contract prevails when the gains from marriage are large and persistent, that is, when the economy is in the upper-right corner. Singleness prevails in the other cases.

Note that the prevalence of the short-term contract depends significantly on the level of the cost of marriage. To illustrate this, the two figures below show the case where the cost of marriage λ is lower than before, and equals 0.05. In this case, the short-term contract would prevail for an even larger interval of values for household production parameters.

Figure 3: Numerical Exercise (2): $\lambda = 0.05$



The comparison of the left and right figures illustrates that the introduction of short-term marriage contracts would not only reduce the prevalence of standard long-term contracts, but, also, of singleness, depending on the values of household production parameters η and δ .

4 Conclusions

Although the economics literature paid a large attention to various aspects of the marriage contract, the issue of the optimal duration of the marriage contract has remained largely unexplored. In this paper, we developed a simple two-period collective household model where agents make decisions about their future marital status

at different points in time, and compared the virtues of long-term and short-term marriage contracts.

Our major conclusions are the following. First, under a time-invariant household production technology, the traditional long-term contract dominates generally the short-term contract. Second, once the household production technology involves increasing or decreasing returns from cooperation over time, then it appears that the short-term contract dominates the long-run one under a large interval of values for preference and production parameters. Third, a more equal distribution of the bargaining power within the household favors also the short-term marriage contract.

Finally, it may be worth to emphasize some limitations of the present work, which invite further research. First, although one could interpret children as the produced good, it remains that the fertility decision may affect the marriage decision in a more complex way than described in our model. In particular, children could matter not only as consumption goods, but also as investment goods, or as an object of parental altruism. Second, this model includes only one type of externalities (i.e. production externality within the couple), and leaves other externalities aside (e.g. jealousy of some couples, social norms). Third, this model is purely deterministic. Obviously real-life marriage decisions involve risk, and this may affect the desirability of the two kinds of marriage contracts.

5 Appendix

5.1 The Model

At the beginning of $t = 1$, the utilities in each marital status are the following:

1. *Long-term contract:* Married agents that remain married solve the following problem:

$$M_1 = \max_{\{c_1^j\}_{j=f,m}} \sum_{j=f,m} \mu^j \left[\log c_1^j + \beta \sum_{j=f,m} \mu^j \left\{ \begin{array}{l} M_2^j \text{ if remain married} \\ D_2^j \text{ if divorce} \end{array} \right\} \right]$$

$$\text{subject to} \quad : \quad c_1^f + c_1^m \leq \eta 2I$$

Policy function $\forall j = f, m$:

$$\max \{ [\log (2\mu^j \eta I) + \beta \log (2\mu^j \eta \delta I)], [\log (\mu^j \eta 2I) + \beta \log [(1 - \gamma) I]] \}$$

2. *Long-term contract:* Married agents who get divorced, solve the following problem:

$$M_1^j = \max_{\{c_1^j\}} \left[\log c_1^j + \beta \left\{ \begin{array}{l} M_2^j \text{ if remarry} \\ D_2^j \text{ if remain divorced} \end{array} \right\} \right]$$

$$\text{subject to} \quad : \quad c_1^j \leq (1 - \gamma) I$$

Policy function $\forall j = f, m$:

$$\max \{ [\log [(1 - \gamma) I] + \beta \log (\mu^j (1 - \lambda) \eta 2I)], [\log [(1 - \gamma) I] + \beta \log (I)] \}$$

3. *Long-term contract:* Single agents who get married solve the following problem:

$$S_1^j = \max_{\{c_1^j\}} \left[\log c_1^j + \beta \left\{ \begin{array}{l} M_2^j \text{ if remain married} \\ D_2^j \text{ if divorce} \end{array} \right\} \right]$$

$$\text{subject to} \quad : \quad c_1^j \leq \eta (1 - \lambda) 2I$$

Policy function $\forall j = f, m$:

$$\max \{ [\log ((1 - \lambda) 2\mu^j \eta \delta I) + \beta \log (\mu^j \eta 2I)], [\log ((1 - \lambda) \mu^j \eta 2I) + \beta \log [(1 - \gamma) I]] \}$$

4. *All contracts:* Single agents who remain single solve the following problem:

$$S_1^j = \max_{\{c_1^j\}} \left[\log c_1^j + \beta \left\{ \begin{array}{l} M_2^j \text{ if remarry} \\ S_2^j \text{ if remain (divorced) single} \end{array} \right\} \right]$$

$$\text{subject to} \quad : \quad c_1^j \leq I$$

Policy function $\forall j = f, m$:

$$\max \{ [\log(I) + \beta \log((1 - \lambda) \mu^j \eta 2I)], [\log(I) + \beta \log(I)] \}$$

5. *Long-term contract*: Divorced agents who remarry solve the following problem:

$$\begin{aligned} D_1^j &= \max_{\{c_1^j\}} \left[\log c_1^j + \beta \begin{cases} M_2^j & \text{if remain married} \\ D_2^j & \text{if divorce} \end{cases} \right] \\ \text{subject to} & : c_1^j \leq (1 - \lambda) \eta 2I \end{aligned}$$

Policy function $\forall j = f, m$:

$$\max \{ [\log((1 - \lambda) \mu^j \eta 2I) + \beta \log(2 \mu^j \eta \delta I)], [\log((1 - \lambda) \mu^j \eta 2I) + \beta \log[(1 - \gamma) I]] \}$$

6. *All contracts*: Divorced agents who remain divorced solve the following problem:

$$\begin{aligned} D_1^j &= \max_{\{c_1^j\}} \left[\log c_1^j + \beta \begin{cases} M_2^j & \text{if remarry} \\ D_2^j & \text{if remain divorced} \end{cases} \right] \\ \text{subject to} & : c_1^j \leq I \end{aligned}$$

Policy function $\forall j = f, m$:

$$\max \{ [\log(I) + \beta \log((1 - \lambda) \mu^j \eta 2I)], [\log(I) + \beta \log(I)] \}$$

7. *Short-term contract*: Married agents that re-married solve the following problem:

$$\begin{aligned} M_1 &= \max_{\{c_1^j\}_{j=f,m}} \sum_{j=f,m} \mu^j \left[\log c_1^j + \beta \sum_{j=f,m} \mu^j \begin{cases} M_2^j & \text{if re-married} \\ S_2^j & \text{if naturally separate} \end{cases} \right] \\ \text{subject to} & : c_1^f + c_1^m \leq \eta 2I(1 - \lambda) \end{aligned}$$

Policy function $\forall j = f, m$:

$$\max \{ [\log(2 \mu^j (1 - \lambda) \eta I) + \beta \log(2 \mu^j (1 - \lambda) \eta I)], [\log(2 \mu^j (1 - \lambda) \eta I) + \beta \log(I)] \}$$

8. *Short-term contract*: Married agents who “naturally” separate, solve the following problem:

$$\begin{aligned} M_1^j &= \max_{\{c_1^j\}} \left[\log c_1^j + \beta \begin{cases} M_2^j & \text{if remarry} \\ S_2^j & \text{if remain single} \end{cases} \right] \\ \text{subject to} & : c_1^j \leq I \end{aligned}$$

Policy function $\forall j = f, m$:

$$\max \{ [\log(I) + \beta \log(2 \mu^j (1 - \lambda) \eta I)], [\log(I) + \beta \log(I)] \}$$

9. *Short-term contract*: Single agents who get married solve the following problem:

$$S_1^j = \max_{\{c_1^j\}} \left[\log c_1^j + \beta \begin{cases} M_2^j & \text{if remain married} \\ S_2^j & \text{if naturally separate} \end{cases} \right]$$

subject to : $c_1^j \leq \eta(1 - \lambda) 2I$

Policy function $\forall j = f, m$:

$$\max \{ [\log(2\mu^j(1 - \lambda)\eta I) + \beta \log(2\mu^j(1 - \lambda)\eta I)], [\log(2\mu^j(1 - \lambda)\eta I) + \beta \log(I)] \}$$

10. *Short-term contract*: Divorced agents who remarry solve the following problem:

$$D_1^j = \max_{\{c_1^j\}} \left[\log c_1^j + \beta \begin{cases} M_2^j & \text{if remain married} \\ S_2^j & \text{if naturally separate} \end{cases} \right]$$

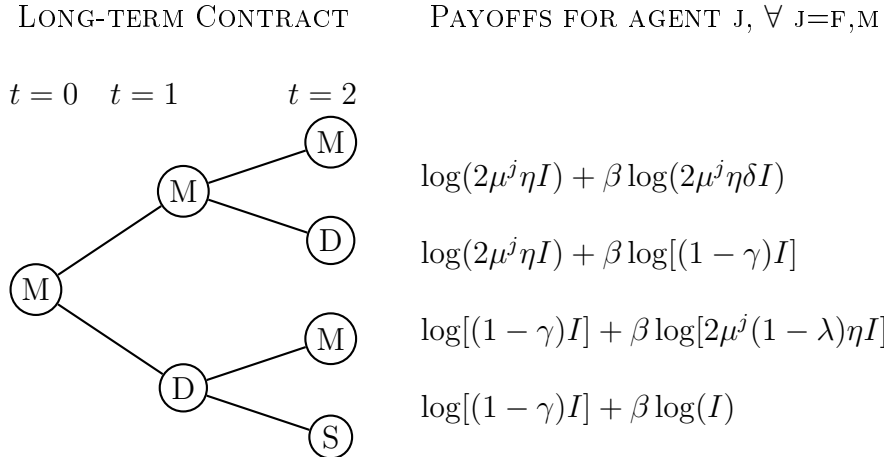
subject to : $c_1^j \leq (1 - \lambda) \eta 2I$

Policy function $\forall j = f, m$:

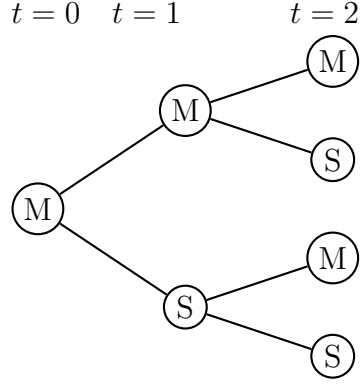
$$\max \{ [\log(2\mu^j(1 - \lambda)\eta I) + \beta \log(2\mu^j(1 - \lambda)\eta I)], [\log(2\mu^j(1 - \lambda)\eta I) + \beta \log(I)] \}$$

5.2 The Decision Trees

The trees below illustrate the payoffs from the different paths. Note that if $\delta = 1$, we are back to the case we consider in the first section. The case in which agents are born as divorced is omitted, as it is analogous to the case in which they are born as single.



SHORT-TERM CONTRACT



$$\log(2\mu^j(1-\lambda)\eta I_1) + \beta \log(2\mu^j(1-\lambda)\eta I)$$

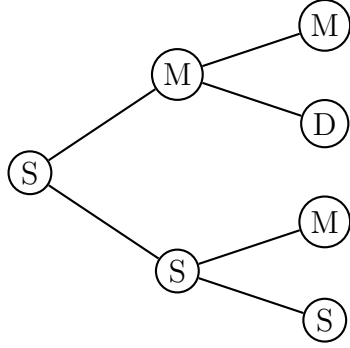
$$\log(2\mu^j(1-\lambda)\eta I) + \beta \log(I)$$

$$\log(I) + \beta \log[2\mu^j(1-\lambda)\eta I]$$

$$\log(I) + \beta \log(I)$$

LONG-TERM CONTRACT

PAYOFFS FOR AGENT J, $\forall J=F,M$



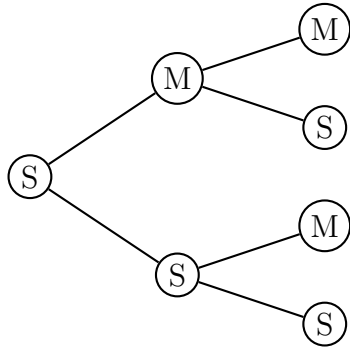
$$\log[2\mu^j(1-\lambda)\eta I] + \beta \log(2\mu^j\eta\delta I)$$

$$\log[2\mu^j(1-\lambda)\eta I] + \beta \log[(1-\gamma)I]$$

$$\log(I) + \beta \log[2\mu^j(1-\lambda)\eta I]$$

$$\log(I) + \beta \log(I)$$

SHORT-TERM CONTRACT



$$\log[2\mu^j(1-\lambda)\eta I] + \beta \log(2\mu^j(1-\lambda)\eta I)$$

$$\log[2\mu^j(1-\lambda)\eta I] + \beta \log(I)$$

$$\log(I) + \beta \log[2\mu^j(1-\lambda)\eta I]$$

$$\log(I) + \beta \log(I)$$

5.3 Proof of Proposition 1 and 2

Proposition 1. The proof follows from comparing the payoffs of the different paths for the two contracts.

Consider case (a). Start with the couples that are born as married. Assume that $2\mu^j\eta > 1$. Comparing the payoff of the first branch of the tree, i.e. $\log(2\mu^j\eta I) + \beta \log(2\mu^j\eta I)$, it is easy to see that remaining married for both of the periods is the optimal choice. Now, consider the short-term contract. Under the same condition, the payoff given by a two-period long-term contract marriage is still bigger than all the payoffs of the second tree. Hence, if $2\mu^j\eta > 1$, agents who start out as married will choose a long-term marriage contract.

Now, consider the agents that start as singles (or divorced). Assume that $2\mu^j(1 - \lambda)\eta > 1$, which implies that $2\mu^j\eta > 1$. Under this condition, the optimal choice is to get married and remain married for the two periods avoiding the cost of remarriage.

Consider case (b). Assume $2\mu^j\eta \leq 1$. Consider the agents that start out as married. Comparing the payoffs of the first and second tree, it is easy to see that the optimal choice is a short-term contract which allows to separate without incurring in divorce costs, and remain single in the last period.

If agents are singles, they will be indifferent between a long or short-term marriage as they will not choose to marry.

Proposition 2. This proposition summarizes the optimal choices of the couple, given the optimal choice of each individual $j = f, m$. Table 3 proves the Proposition. LT stands for long-term marriage and ST stands for short-term marriage. The blank cells are for combinations of parameter values that are not feasible. Moreover, $\bar{\mu} = \max\{\mu^m, \mu^f\}$ and $\underline{\mu} = \min\{\mu^m, \mu^f\}$.

Table 3: Proposition 2

	$2\underline{\mu}(1 - \lambda)\eta > 1$	$2\underline{\mu}\eta \leq 1$
$2\bar{\mu}(1 - \lambda)\eta > 1$	LT	ST if initially married; singleness otherwise
$2\bar{\mu}\eta \leq 1$		ST if initially married; singleness otherwise

Note that if there exists short-term contracts, the optimal choice of spouses does not depend on the legal regime of the divorce (i.e. consensual or unilateral). If short-term contracts are not available, divorce would have prevailed in the cases described in Proposition 2.

5.4 Proof of Proposition 3 and 4

Proposition 3. To prove this proposition it is sufficient to compare the payoffs of different path of the decision trees as we did for Proposition 1. We can see that if $\delta = 1$, we are back to case (a) of Proposition 1.

Proposition 4. The difference with Proposition 3 is in the decision trees we have to compare as the agents are now initially married.

5.5 Proof of Proposition 5 and 6

Proposition 5. In case of existence of short-term contract, Proposition 5 show which contract prevails in cases (a)-(f) depending on the bargaining power of the two spouses. Consider case (a)-(a). In this case, both of the spouses prefer a long-term marriage contract. Consider case (a)-(c). Here, the spouse with $\underline{\mu}$ prefers a long-term contract, while the spouse with $\bar{\mu}$ prefers a short-term contract. Hence, the contract that will be chosen by the couple is a short-term contract with remarriage in the second period. The other cases are similar.

Proposition 6. The reasoning is similar to the one for the proof of Proposition 5, with the difference that short-term contracts are not available.

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